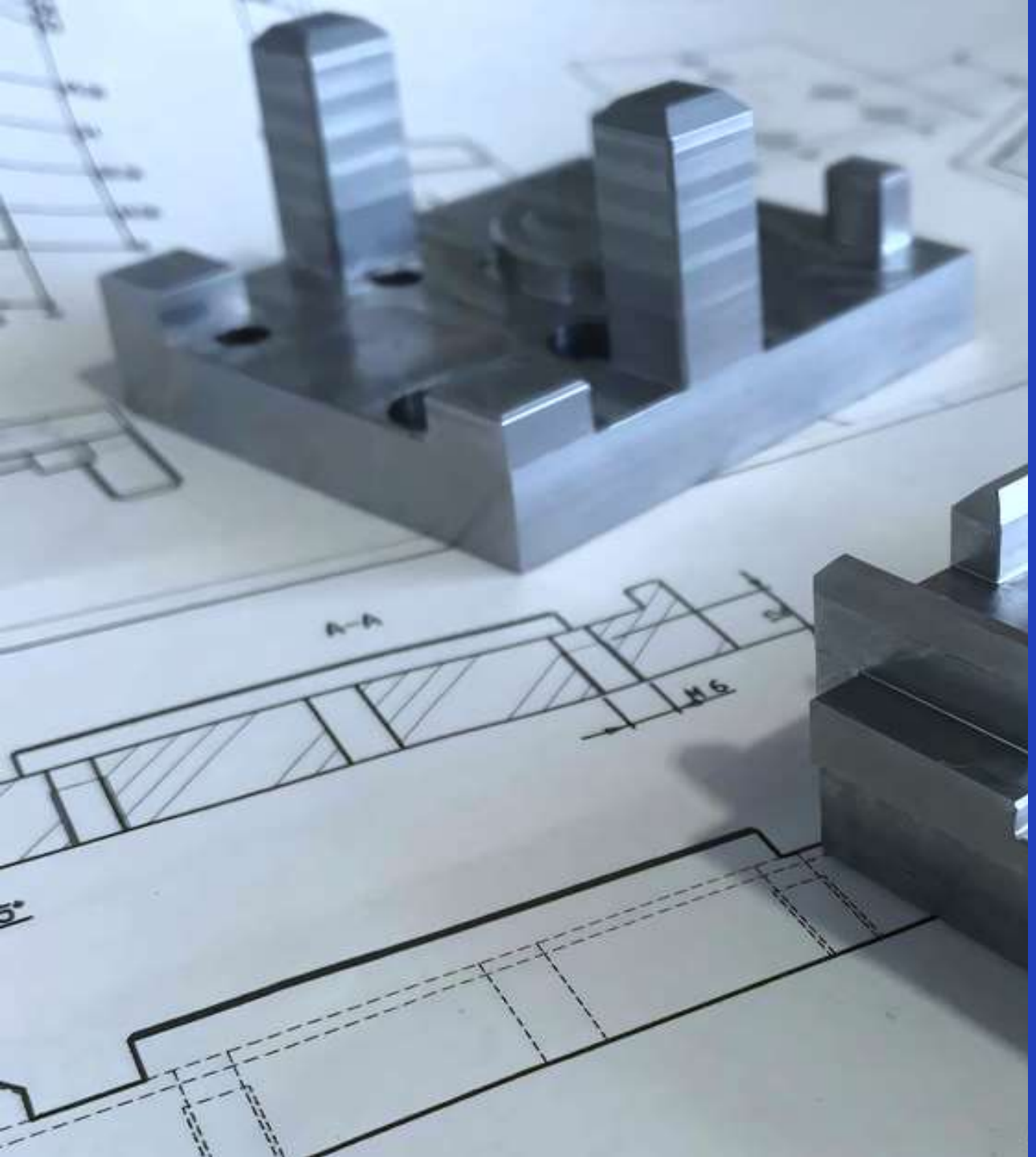


CNC Machining Design Guidelines

Tolerance

At SogaWorks, We machine your custom parts according to ISO2768 medium unless otherwise specified. Tighter tolerances can be achievable, we can manufacture parts with a tolerance tighter than ±0.0254mm(±0.001 inches) according to your 2D drawing specifications.

Recommendation

Use tighter tolerances when it is necessary.

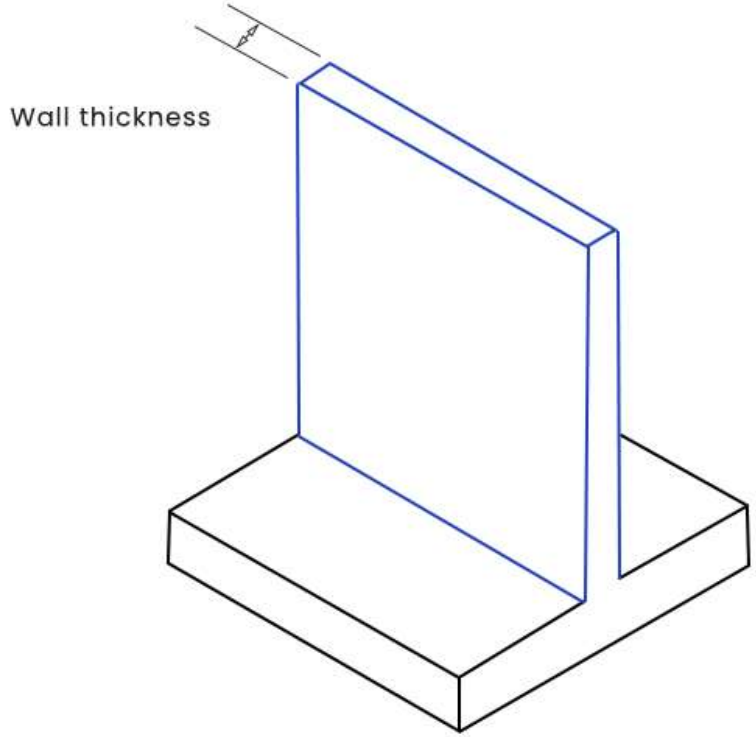
Standard Tolerance: ISO2768-m

Wall thickness

The choice of wall thickness can be tricky, as decreasing wall thickness may lead to the reduction of stiffness of materials, increasing vibration during machining and then decreasing the achievable dimensions.

Recommendation

Design walls with a thickness of 0.8mm for metals as well as 1.5mm for plastics.



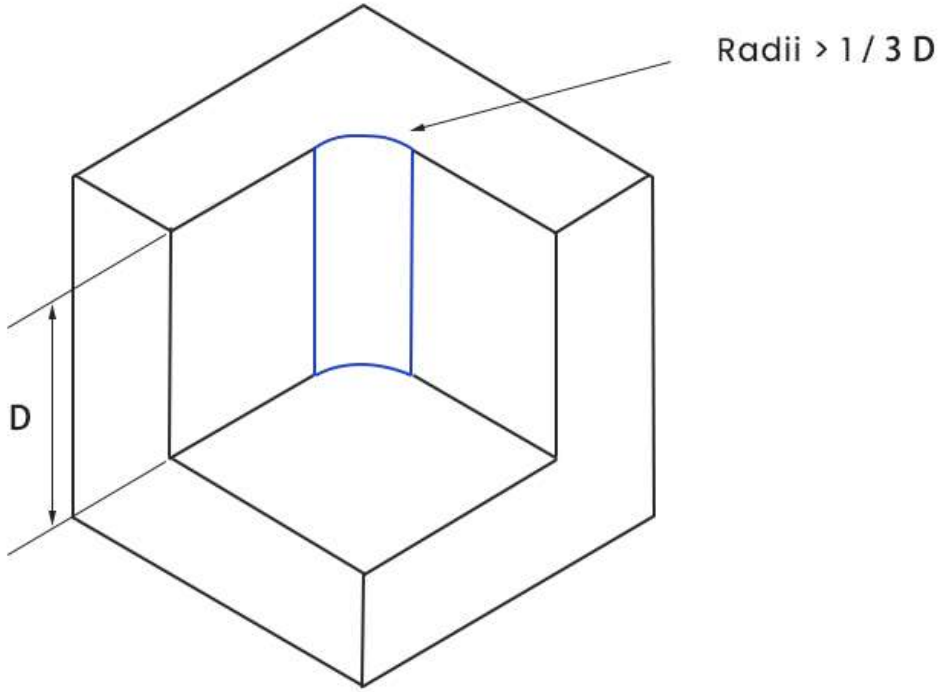
0.8mm for metals, 1.5mm for plastics

Internal Edges

End mills and other cutting tools utilized in CNC machine machining are usually cylindrical, which leads to a radius within corners that have been machined. Cutting tools with smaller diameters will often reduce the radius, however, it isn't always possible to create internal vertical corners because of the limitation of tool's diameter. Additionally, it can lead to more issues, including delays in lead times and increases in costs.

Recommendation

The vertical radius is one-third the size of the cavity or greater.



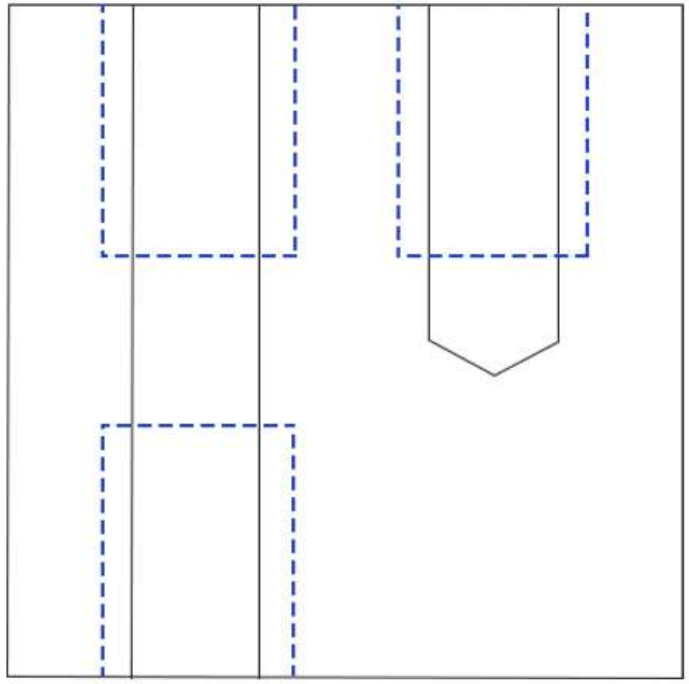
⅓ times cavity depth or larger

Thread Length

SogaWorks can accommodate and cut metric threads, imperial UNC, and UNF among others. All threads should be marked on your 2D drawings. It is believed in the minds that the longer the thread is, the stronger the connection. However, increasing the length of the thread to 1.5 times the diameter will make a difference to the connection.

Recommendation

Design thread by using a length of 1.5 times to 3 times larger than the diameter.
For threads that are in blind holes, add an unthreaded length that is equal to 1.5 times the diameter.



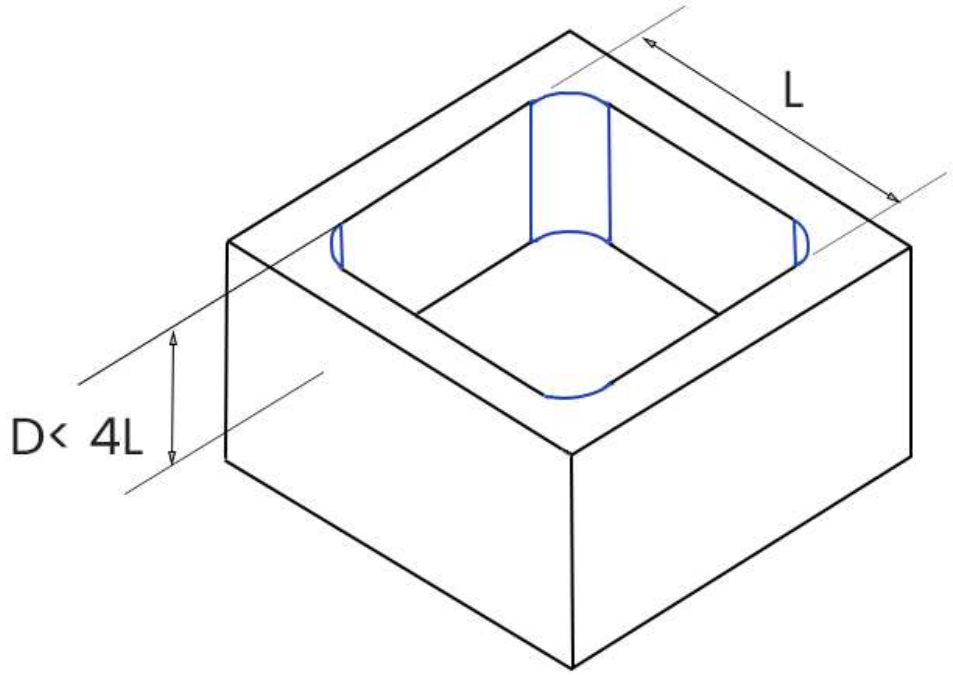
1.5x to 3x hole diameter

Cavities

End mill tools are equipped with a limited cutting length, which is typically 3-4 times the diameter. Deflection of the tool and vibrations increase when the cavities have a higher depth-to-width ratio.

Recommendation

Restrict the depth to 4 times the length to guarantee good results. Deeper holes(up to 10 times the diameter) are available but will cost more.



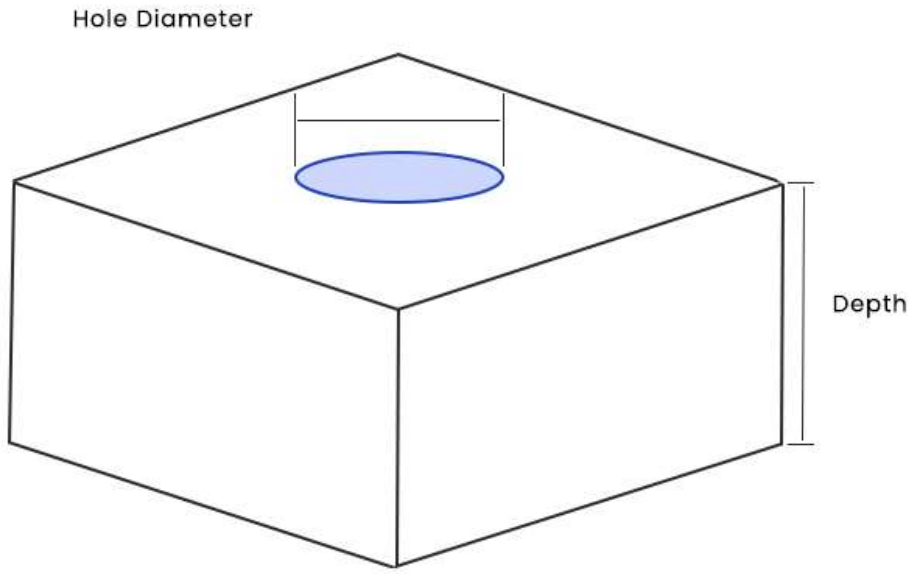
Limit depth to 4x its length

Hole

Holes are machined using either a drill bit or an end mill tool. For high-accuracy holes with a diameter smaller than 20mm, use a standard diameter.

Recommendation

Limit hole depth up to 4 times the diameter, deeper holes(up to 10 times the diameter) are available but will cost more.



Limit depth to 4x its length

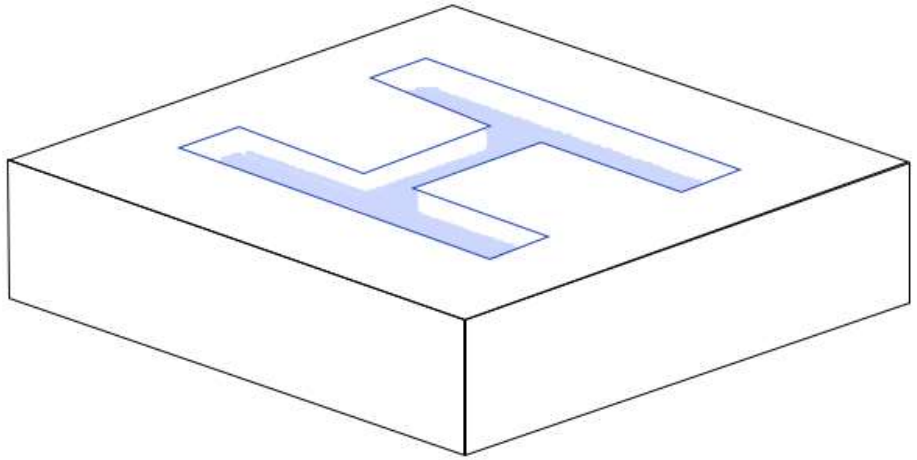
Text

When you consider adding text to machined parts, there may be many reasons, such as assembly instructions, part numbers, legal advice or warnings, or just a logo.

Recommendation

Choose the engraving instead of embossing. Because engraving takes less material.

Use Sans Serif fonts of at minimum 20 points to avoid small, undesirable characteristics.



Engraved preferred, font size 20 points or larger

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